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ABSTRACT

This action research project sought to increase the waste management and recycling knowledge among 20 children age 4 and 5 years enrolled in a preschool program in Thessaloniki, Greece. A structured interview was developed to assess the children's pre-intervention knowledge of waste management and recycling. It indicated that most children knew little about waste and recycling. Over the course of a 7-month period the children were then exposed to an educational program that used in-class recycling bins, visits to parks and neighborhoods to observe litter, in-class discussions on litter and recycling, role-playing, and a visit to a recycling plant. Results of post-intervention interviews indicated that nearly all of the children understood basic concepts of waste management and recycling, and profited from the program. (Contains 11 references.) (MDM)

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# AN ACTION RESEARCH IN YOUNG CHILDREN (3-5) WITH ACTIVITIES ON SOLID WASTE MANAGEMENT IN GREECE. AN ATTEMPT FOR ASSESSMENT

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# AN ACTION RESEARCH IN YOUNG CHILDREN (3-5) WITH ACTIVITIES ON SOLID WASTE MANAGEMENT IN GREECE. AN ATTEMPT FOR ASSESSMENT

1. With the increasing need to be aware of the energy situation, throughout the world, and the necessity to use solid waste wisely, it is desirable for adults and especially children to develop attitudes beneficial to the environment. It is not unusual to describe human behavior as being the result of a particular set of attitudes and knowledge.

However, attitudes can conflict with one another thus forming a barrier to action. The degree to which individuals see that what they do matters may influence whether they participate in solid-waste reduction behaviors. A key of solution could be education.

In the past decade the area of environmental education has been of great concern to Boards of Education, Universities and teachers form pre-school to College level. This is not without justification, if we consider, closely, the definition of environmental education.

A commonly accepted definition (is the following):

"Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution (Stapp et al. 1969).

Undoubtedly, education has been viewed as the salvation of pending environmental problems, if we could produce environmentally literate citizens maybe we could begin to solve the environmental problems in time. But if after 20 years of effort we have not accomplished this goal, then we need to consider new and drastic measures.. When we have an accurate definition of the problems, the decisions that follow are often clearer (although not

necessarily easier) and solutions tend to be more long term. It is of great importance that educators must be sure that their messages are ecologically sound and they do not perpetuate, environmentally, irresponsible myths.

Consequently, we need to make environmental education the focal point of the entire educational process, e.g. it should not only be shared equally in mathematics, reading and writing, but it should also be an integral part of all courses.

Why is such a dramatic change needed? Why can't we continue on as before? The answer can be explained in ecological terms. People must change, because the circumstances in which we now live have changed. As Malone and Corell (1989) have said of the future: "The capacity of the global life-support system to sustain a technologically advanced and exponentially expanding civilization is likely to collapse within the foreseeable future" (p. 7).

> UNESCO - UNEP believes that "Environmental education must be instilled in children when they are very young; a late start means an arduous effort to break through already formed habits and attitudes, the stereotypes and images the learner has absorbed from his daily life with the help of the mass media" (page 37).

2. Having in mind the aformentioned about environmental education, in general, and knowing the importance of developing ecological consciousness in early years we planned a recycling program in kindergarten.

Cognitive theories state that the structure of human personality is formed in the first five years of life. Therefore, helping young children to become aware of ways to manage waste, wisely, may help to establish habits and attitudes which will be environmentally friendly in the future. Hence, children can have an impact on the attitudes and the values of their friends and their parents encouraging change in present behavior. Another reason for beginning environmental programs at an early age is that the children of today will be the Planet's citizenry and the decision makers of tomorrow.

## Review of literature

A number of researchers have investigated energy use in families. Hogan and Paolucci (4) have studied family values and their relationship to energy management. Their results indicated a significant relationship between environmentally conscious family value patterns and energy management practices at home. The higher levels of education of husband and wife are related to environmental consciousness.

Stevens and Jeppesen (5) found that in class energy instruction and task oriented activities whereby students are directly involved in attempting to manage energy; wisely" gave a positive impact on student energy conservation attitudes and actions. Joy Palmer, in United Kingdom, in an research concerning "understanding and misunderstanding of concepts related to waste management in young learners" concluded that "they do indeed frequently possess blurred or inaccurate understanding of processes and events in the world around them. Yet, alongside this blurred understanding exists a strong base of accurate scientific knowledge upon which early years teaching may build with the aim of helping young children to understand and to be concerned about a range of environmental issues" (Joy Palmer, 1993).

A great deal has been written about the need for environmental education with school age and older children. A modest amount of research of energy information and wise use of energy has been accomplished. Moreover, there appears to be a void in the literature regarding young children's knowledge of waste management.

## 1. Objectives

The overall objective of this study was to determine if the -waste management information, possessed by four and five-year-old children can beneficially be increased as a result of a waste management education program. Specifically, we purposed to test:

(i) The feasability of carrying out an environmental program, with all the included difficulties in pre-school children.

(ii) The quantity and quality of knowledge on waste management acquired by these children and the degree of applicability by them.

(iii) In their activities, if they eventually, by the acquired information, had changed attitudes toward waste management.

## 2. Subjects

Subjects for the study included the four and five year old children enrolled in the 4th public kindergarten of Triandria, Thessaloniki. It is notable that Thessaloniki is the capital city of Macedonia, the largest part of Northern Greece. Triandria is a municipality of 17 thousands population at the east of the central city.

The tested subjects included: 11 girls and 9 boys, 6 children four year old and 14, five year old. These children were primarily from middle class socio-economic backgrounds and represented purely Greek nationality and culture. In this public school were practising student teachers from the Aristotle University, Faculty of Education. Their co-ordinator kindergarten teacher was Olga Apanomeritaki who was in charge for this environmental study.*

* It has to be noted that the program was supported by the Major of Triandria and the parents who were very much involved in the activities of the Program.

## 3. METHODS AND PROCEDURES

### a. Pertinent Information

### Development of Pre-school Test of waste information

As no known test was available for the same study a test was developed by the investigator and Alexandros Georgopoulos (assistant professor in Human Ecology). In Greece the described program might be considered as a pilotic one.

Therefore availability of a carefully developed and psychometrically sound scale to measure children's global environmental attitudes and knowledge would be a valuable teaching and research tool.

The test was a semi-structured interview consisting of four question addressed to each child, individually.

Since, the interviewer was well known to children, consequently they felt conveniently talking to her. All children were tested in two-day period. The test took an average of 15 minutes to administer. Each child was interviewed at the Principal's office at a convenient time, i.e.. when other important activities were not being interrupted.

### b. Questionnaire

The questions asked were:

- Do you know if we can re-use paper?
- Do you know what paper is made of?
- Do you know what we do with our litted trash? (when their answer was that we throw them in a bin, then they were asked what happens to it after we have put it in the bin).
- Do you know what is recycling? Have you ever heard that word?

## 4. WASTE MANAGEMENT - RECYCLING PROGRAM

**First part:**

**a. Description of inquiry stages:**

After the pre-test, was administed:

The student teacher - the class teacher, and the interviewer conducted a seven month educational program. The concepts (what is waste, who and why throws it away, what kind of waste we usually produce) were proper one for each age level and revelant all activities conducted appropriately to the corresponding level. All activities conducted were based on the principles that children learn best through first-hand experiences by: a) manipulating materials, and b) by discussing what is happening as it takes place. For the economy of this paper we cant' refer with details in the whole program, briefly it was divided into three parts:

In the first part, right after the test, an environmental corner was created; three bins were put in the school yard, by a municipal clerk for recyclable materials: as glass, paper, aluminum.

Visits to nearby parks and our neighborhood, observation of litters on the ground and/or waste bins, took place many times.

Discussion in the class-room and focusing on the problem: How we all can reduce the produced waste.

***Second part:***

Since none of the children knew what happens to waste after it goes to a truck we: teachers, childrens and some parents - followed the Triandria's truck and visited the landfill of Tagarades, half an hour away from Thessaloniki.

Revelant work was in drama, literature role playing, discussion on the concepts waste reduction, recycling, collecting recyclable materials, energy saving, better environment, etc.

Art activities: "new from the old".

We recycled paper at school with the children visit to paper recycling factory, and we brought 500 kilograms of recyclable paper to the factory. Children attended the whole procedure of weighting it, making it into paper pulp and after new paper - without destroying the forest.

***Third part.***

Children wanted to express to the rest of the community, what they lived, what they had seen about waste management, what they learnt by first hand-experience. They interviewed passengers outside of school, with questions like "Is the waste useless?"

Visit to the Major with special request like: more bins for recyclable materials, more trees, cleaner parks etc. for their neighborhood matching with the message "think globally, act locally".

## 6. Administering of Post-test

Immediately, following the waste management program in 13th of May 1992, the same questionnaire was administered with the same way to the same children from the same person.

## 1. CONCLUSIONS

It has to be noted that conclusions are derived from pre an post-tests, discussion with children's parents, and observations to the children for the holistic approach to the environment conceptions.

Analytically:

***In the first question:*** "Do you know if we can re-use paper?".

From twenty children: only two, five year old boys:

1. "If we clean it well - well !!! then we can write again..." (Nontas)

2. "... I know, someone can press the rotten paper, let it dry and becomes new..." (Dimitris)

***Second question:*** "Do you know what paper is made of?"

One 5 year old boy:
"It is made form tiny, little pieces of bad paper ..." (Nontas).
Two four year old girls: "From wood..."
One 5 year old girl: "... from clay, black paper from black clay and white paper from white clay..."
A four year old boy: ".... from everything...".
A four year old girl: " ... I think from flour..."

***Third question:*** Do you know what happens to the waste? (In case their answer is that we throw it in a bin, they are asked what happens to it after we have put it in the bin).

In this question all children provided comments, such as the following:

## FIGURE I

**Waste materials related scientific concepts map for twenty subjects**

Common answer:
mothers throw it in the bin and after the "bin man" to his truck
From the truck...
after?
in a big bag
in a secret place
they put it on fire
in a big house
where the other is
in the mountain
in the fields so nobody can see him
to Athens and America
in a yard if it is from soil
In a hole which gulps down
it throws far away
in a stack house
in a secret place that nobody can see him
where the other is
after?

A five year old boy: "It takes it to super market, cleans it and fill it with milk again ..." (Nontas).

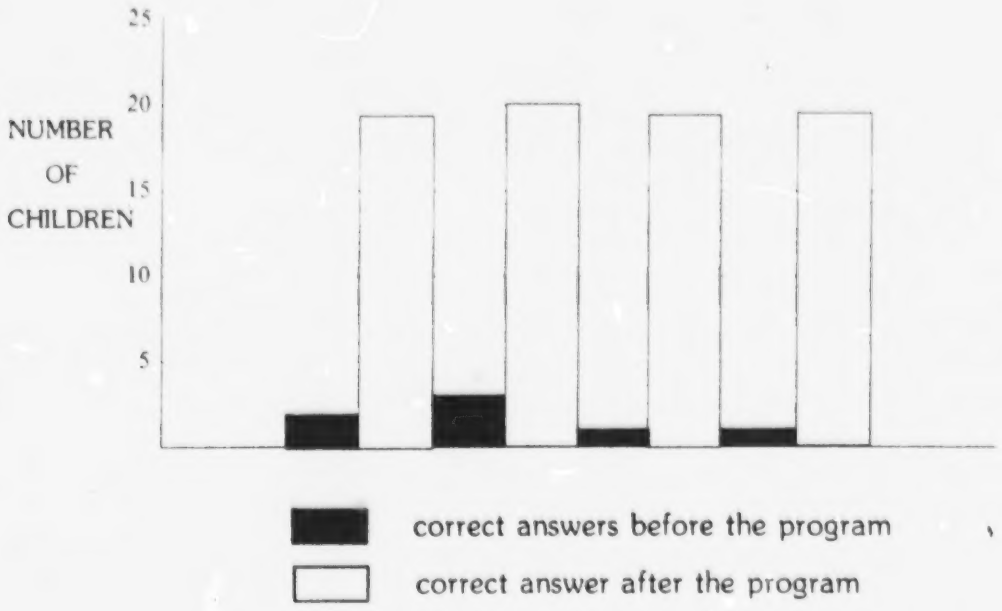
A 5 1/2 year old girl: " In a factory where they make them white and clean when they are dirty..." (Niki).

***In the fourth question:***

100% of the total sample provided the answers: "No" or "I don't know". This can be explained by the fact that recycling in Greece is a new idea-activity and in their close environment never heard that word. Knowing that the source of their knowledge is usually, family, peer-group, friends, television, books and definitely the neighborhood they live.

**Results of Pre-test and Post-test**

There is a considerable difference between the two tests which is presented in the graph: Figure 2.



**2.** Analysis of the data also provides insight into the gaps and errors in children's thinking, and examples of incomplete knowledge. Many of the same wrong or incomplete answers and explanation are given by a substantial proportion of the subjects, thus; illuminating areas of knowledge and understanding that could well benefit from attention in early years school programmes. For example, when discussing the waste disposal issue, a common answer given to the question "Do you know what happens to the waste?" is: "the bin man puts it in his truck" with no further elaboration or explanation, they used only their imagination. This may well represent a good start towards formation of more accurate and complete scientific understanding. Other answers are obviously much further removed from scientific accurancy, but are fascinating neverless - providing insights into levels of children's thinking which will be helpful and illuminative for teachers aiming to establish existing knowledge bases of children entering school.

The *first hypothesis*: (if it was possible to carry out an environmental program with all the included difficulties in pre-school children) seemed to all of us that it was possible only if it was well planned, because a variety of problems were encountered.

The *second hypothesis* what is the existing scientific knowledge on waste management it is illuminated by the graph.

The *third hypothesis*: In the end of the program had they acquired more information, and changed attitudes toward waste management?

Clearly, verified as all age groups and both sexes profited from the waste program.

Moreover, judging from the children's participation in the activities like bringing to school every day recyclable materials they seemed to have changed attitudes towards waste.

3. Closing this paper, it has to be stressed that:

a. Education appears to be the most powerful indicator of awareness and concern for waste management, and

b. Collected data so far offer a convincing argument for the encouragement of learning experiences, which includes well planned classroom-based tasks, takes account of an identified progression in the development of accurate concepts relating to environmental matters, and suggests that the access of young people to the natural world outdoors is important to the translation of knowledge into active concern for our world (2, 3).

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